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HERISSON. THE SPHYGMOMETER.

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THE SPHYGMOMETER:

AN INSTRUMENT

WHICH EXHIBITS TO THE EYE

THE ENTIRE ACTION OF THE ARTERIES;

THE USEFULNESS OF THIS INSTRUMENT

IN THE STUDY OF ALL DISEASES;

RESEARCHES

ON

THE DISEASES OF THE HEART;

AND

ON THE MEANS OF DISCRIMINATING THEM.

A MEMOIR,

PRESENTED TO THE INSTITUTE OF FRANCE.

BY DR. JULIUS HERISSON, OF PARIS.

14.832

TRANSLATED FROM THE FRENCH.

By JOSEPH G. NANCREDE, M. D.

PHILADELPHIA:

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PREFACE.

THE instrument which the following pages are designed to introduce to the notice of the medical profession in this country, has been very recently invented by a physician in Paris. He thinks it will be found an additional means of facilitating the investigations of the healing art, and at the same time of imparting to them an exactness, in which they are too often confessedly defective. A very great sensation has been excited by it in the French capital. The press teems with its praises, and with anticipations of the various circumstances in which it is expected to prove available.

The Institute of France has, it appears, given to the invention the sanction of its high literary authority. The celebrated Dr. Magendie, whose name alone is a guarantee for the accuracy and impartiality of the opinions he expresses on this subject, concludes his report with the proposal of "a vote of thanks to Dr. Herisson, the author of this most useful and ingenious discovery," which was immediately concurred in by the Academy of Sciences of the Institute of France.

The translator having had the good fortune, through the kindness of a revered friend, to receive a copy of the Memoir, accompanied by one of the Instruments, the first that have crossed the Atlantic, hastens to communicate them to his medical brethren. He is also endeavouring to have the Instruments constructed here; and should his efforts be successful, he will lose no time in conveying the information to the Medical Public.

THE SPHYGMOMETER.

TO THE INSTITUTE OF FRANCE.

GENTLEMEN—

AFTER a variety of attempts not all equally satisfactory, but all sufficiently conclusive to establish the possibility of success, I determined to have an instrument made which should exhibit to the eye the whole action of the arteries. My next object was to find an artist sufficiently skilful to realize my ideas, and I was fortunate enough to meet one. Mr. Garnier, a young mechanician already known by his valuable discoveries in the art of clock making, was kind enough to assist me with his talents, his dexterity, and his genius. The sphygmometer which I now have the honour of presenting, is as much his work as it is mine, and it is in our joint names that I now submit it for your approbation.

I will in the first place, gentlemen, describe our instrument, and the mode of employing it; I will next have the honour to demonstrate its usefulness in the practice of medicine; and I will conclude this paper with the result of my researches into the study of the diseases of the heart. I flatter myself that in the clinical portion of this paper, you will find more than one motive for believing that my labours are already of some value to medical science.

The instrument which I designate by the word sphygmometer, is composed of a glass tube graduated on its anterior face, covered posteriorly with coloured paper, and terminating below in an excavated hemisphere of ivory or steel. The hemisph-

rical cavity contains a certain quantity of mercury, and is closed inferiorly by a very fine membrane, while above it opens into a capillary tube of the same material of which its own walls consist, continuous with the glass tube, and of similar dimensions. All communication between the graduated portion of the canal, and the cavity at its base, is interrupted at will by means of a small stop-cock. The mercury in the semi-globular receptacle, is susceptible, when the instrument is properly applied on the course of the artery, of receiving and exhibiting all its action in the transparent tube. To investigate diseases of the heart, recourse is had to the same instrument constructed on a larger scale. It is proper to remark, however, that the truncated globe, the capillary tube, and the quantum of mercury, being the same in all sphygmometers for the arterial pulse, they are all uniform in power, and furnish an equal grade of measurement.

The person whose pulse is to be examined, may be either in a sitting or recumbent posture: if sitting, the physician places himself outside or before the arm, the artery of which he is to consult, with that arm on his left hand, or on his thigh, or supported by the arm of a chair. The instrument, held at its basis between the thumb and index of the right hand, is now placed on the course of the radial artery, so as to make it cross immediately the centre of the reservoir. The right hand will endeavour, by pressure upon the artery, to discover its greatest degree of impulsion; that point once determined, the inferior parts of the thumb and index rest upon the sides of the artery; its whole action is then transmitted to the column of mercury, which appears to be the continuation of it.

If the patient is in bed, the physician will place himself opposite the arm of his patient; this arm will be fixed in his left hand, while he will use his right hand as described in the sitting posture.

I now arrive at the qualities of the instrument, and at this word quality, I am apprehensive you may suspect me, gentlemen, like all authors of new notions, of exaggeration. You may, however, be easy on that head. I shall proclaim only the services already rendered; as to those it may be destined to ren-

der hereafter, I leave to your judgment the care of pointing them out.

The positive advantages of this instrument, are to exhibit to the eye the whole of the motions of the heart, when applied over the anterior region of the thorax corresponding to that organ; and all the motions of the pulse, when applied to the course of an artery.

Ought we to give it the preference over the sense of touch, when our object is to estimate the strength and rhythm of the pulse?

To resolve this important question, which should at once decide the fate of the sphygmometer, let us begin by examining what is the sense of touch among those who exercise it in investigating the pulse, and let us candidly examine what results it is likely to produce. What strikes me at once, is the diversity of sensation: to produce the same results on all, it would be necessary that the conditions of the organ exercising the touch, should be the same in all individuals, whereas the very reverse is the case; the hands are either young or old, covered with a delicate or coarse skin, either warm or cold; they are either practised or inexperienced, &c., &c. The sensibility of each one is modified, therefore, by each particular circumstance; consequently the judgment of all will vary, because there can be no similarity either in their perceptions, or in the conditions calculated to make it uniform.

The sense of touch, as exercised in exploring the pulse, can only be useful to the physician who exercises it daily, without allowing the interference of any cause having a tendency to destroy its delicacy and tact; but is it infallible even for the individual, who renders no account of the sensations to any one but himself, and can the recollection of this sensation of the day before, or of several days, be sufficiently exact to allow a correct comparison to be drawn? We do not hesitate to answer in the negative; and if this our opinion be correct, how can we, by the aid of the sense of touch alone, appreciate the changes of a pulse in the course of a disease.

Let us suppose, for instance, that the pulse of a patient whom you see for the first time, appears to you strong, re-

gular, equal, &c. : I do not wish to burthen your memory with divers anomalies, which sometimes occur in a healthy as well as in a diseased state; let us suppose, again, that you find to-day your patient's pulse strong and regular, that to-morrow a slight change occurs in the frequency or slowness of the arterial action; will you be enabled to determine, even if you discover any difference, the quantum of increase or diminution of the pulse, as well as the nature of its rhythmical state? No, you cannot; but you will reply, with a good memory and a clear head, that the pulse is rather stronger or weaker; its regularity is no more the same; in all that you have observed, there will be nothing exact or positive; you are aware of a change, but you cannot determine positively its character. Medicine gathers its valuable indications from precise observations only; you therefore encounter the risk of losing these advantages, and your patient that of becoming the victim of the imperfect result of the most attentive investigation.

Is a consultation or meeting of physicians called, the same diversity of opinions, the same obscurity prevails: one will find a hard regular pulse, another thinks its impulse quite moderate, but remarks that there is irregularity; this one thinks it fast, another finds it intermittent; they cannot agree, and from different diagnostic views, will naturally result difference of treatment. The relations and the patient, too often witnesses of these first and inevitable discussions, which are always more or less imprudent, soon lose all confidence in those they have called to their assistance, and will be fortunate, if despondency and apprehension have not even aggravated the disease.

Having thus rapidly demonstrated the insufficiency of the sense of touch as regards the pulse, we hasten to state that this insufficiency cannot be supplied by any other sense, that will enable us to estimate the form as well as the density or laxity of the arteries, and that consequently the instrument, the uses of which we are about to describe, could be of no service whatever without the aid of this sense of touch.

Utility of the Instrument.

A. All medical practitioners are aware of the existence of anomalies of the circulation, and that some are so different from its natural type, that if they did not co-exist with a state of health, we should be induced to consider them as evidences of organic affections of the heart; and what is still more remarkable, if this state of health is disturbed, all these anomalies disappear, and the pulse resumes the physiological characteristic which it displays in other individuals. Nay, the physician can never be positive of the cure of his patient, unless there be a restoration of these phenomena, which might have indicated a morbid state. This is a remark made without the aid of our instrument, but not with the precision that is desirable, and many peculiarities of pulse have not been detected for want of a convenient, correct, and faithful mode of investigating them. You will discover later, gentlemen, that the sphygmometer exhibits to the observer certain phenomena which could not be perceived by the sense of feeling; but we leave this subject for the present, to occupy our attention with every day cases; this instrument is essential to make us familiar with the healthy pulse of those persons we may at some future period be called upon to prescribe for, when labouring under disease; for then we shall be enabled to form a much more correct opinion of the changes induced by disease in that pulse, the healthy state of which is familiar to us.

The instrument will therefore present to the physician, in the first place, the advantage of recording in his note book the exact description of each patient's pulse. It is easily understood, what uses are to be made of these notes, whenever disease makes its invasion. A single case will suffice to show the importance of such data. M, ætat. 30, and healthy; his pulse examined in the morning exhibits by the sphygmometer 10 degrees of elevation, and 60 pulsations in a minute; it is regular, equal, soft, &c. M is indisposed, his pulse now beats 70 in a minute, rises to 12 degrees, is no longer equal, and the intervals between the pulsations are irregular, and the pulse has become hard. It is evident, that by comparing these obser-

vations, we can judge at once, and with certainty, in what manner the circulation has deviated from the physiological state. All the efforts of the practitioner will tend therefore to restore it to its natural condition, by the assistance of those observations made during health, and by comparing the latter with those presented by the state of disease.

If at all times the pulse has been considered as the compass of the physician, I trust that the simile has now become a reality.

B. The sphygmometer becomes of great value when applied to patients in a hospital destined to the instruction of students: the professor having placed it on the arm, every one can see and follow the remarks which the case requires, and judge with his own eyes; otherwise he must take for granted: for his sense of touch can as yet not be sufficiently practised to justify a single reflection, in case the result of his examination does not coincide with that of his teacher.

C. In a medical consultation, each one can in turn apply the instrument, and exhibit it to his colleagues: each one will therefore be enabled to satisfy himself as to the correctness of what he observed while he was a spectator.

D. Consultation Memoirs* have hitherto afforded only approximating data as to the circulation of the patient, who, at great expense, solicits the opinion of a foreigner of celebrity; the result therefore is, that little value is attached to those opinions, and that of the attending physician is adopted. Hereafter, more exactitude in the correspondence will be attainable, and the instrument being the same every where, the estimate formed at St. Petersburg will be understood in Paris.

E. The changes which may occur in the course of a disease, either during or subsequent to the operation of any therapeutic treatment, may be noted, or communicated with accuracy and precision. The physician who will visit his patient either daily or every other day, once enabled to estimate the

* Consultation Memoirs are statements or histories of medical cases, drawn up by the attending physician, and transmitted to other physicians, generally of great celebrity, requesting their opinion as to the nature of the case, its treatment, &c.—J. G. N.

effects of the remedies he is using, will, upon solid data, continue, modify, or change the treatment of the case.*

I conclude here, gentlemen, the exposé of the advantages afforded by the sphygmometer ; I was desirous only of tracing the outlines, and shall feel too happy, if, in the new route I have explored, my colleagues give me some credit for having indicated the means of finishing it more conveniently than I began it. With perseverance, good faith, and the assistance of those men who devote themselves to the natural sciences, we may hope one day to establish a good theory of the pulse ; a theory absolutely wanting in the practice of medicine, and which will spare many errors to those by whom it is prosecuted.

I will now lay before the Academy the result of my researches on the diseases of the heart. I have devoted six years of study to the labour of which this is the summary, and I indulge the hope that this work will be of some service in forming a correct diagnosis, and that it will demonstrate the use which medicine should derive from a method, which, by its nature, places the healing art by the side of the exact sciences.

Diseases of the Heart.

The affections of the heart are numerous, but the important diseases of this organ are more rare than is generally thought. This error proceeds from the fact, that its sympathetic modifications are extremely diversified, and that the latter give rise to frequent disturbances in the exercise of its functions. These

* I am in the habit of attending several persons, subject to apoplectic symptoms. I often examine their pulses, and as soon as I discover that either has passed beyond the degree of impulse necessary to equilibrium, I remove blood, either by leeches or venesection. I have ascertained, that a certain quantity abstracted, is sufficient to restore the pulse to its healthy state : by means of this safeguard, and the accuracy of this method, my patients, heretofore living over a volcano, now pass with some security a peaceable life. The attacks of disease have ceased, and I might almost affirm, that they would experience no further accidents, if they did not deviate too far from the regimen prescribed, and especially if they continued to maintain their circulation at that degree of moderation which the sphygmometer never fails to indicate.

varied disturbances may last for a very long time without producing any lesion of texture: the greater portion of the medical authors who have written on this subject, have, however, affirmed, that of all the viscera, the heart was, next to the lungs, the most subject to organic diseases. I am of a different opinion. Corvisart and Laennec, Bouillaud, Kreysig, Burns, &c., &c., have undoubtedly thrown much light on the diagnosis of the diseases now under consideration; but what value can we attach to their labours, if the only result be the faculty of ascertaining the existence of a disease without hope, and for which medicine offers scarcely any relief? In fact, gentlemen, with all our knowledge, all our researches, and our means of investigation, we have acquired the possibility of discerning and distinguishing organic diseases of the heart, only at that period when they are beyond the resources of our art.

By the aid of my instrument, I can distinguish from its very commencement, the slightest disturbance in the general circulation, and I believe that it is not then impossible to oppose successfully the development of the evil threatening the principal organ. Nervous disturbances are often the only primary symptoms of lesions of texture, and without applying one doctrine in preference to another to the explanation of this pathological phenomenon, I have satisfactorily ascertained, that most of the hypertrophies, indurations, vegetations, and strictures, have commenced by simple rhythmical aberrations.

I shall not discuss this proposition; satisfied that every conscientious practitioner will readily admit its truth. The limits of a memoir, besides, forbid a discussion, the development of which would require half a volume; I will limit myself, according to my promise, to the mention of facts. Facts possess more value for science, than logic does of power to persuade the human mind.

It is through the medium of percussion, of auscultation, of mensuration, and of the signs furnished by the whole organization, that medicine has hitherto progressed in the discovery of the different organic diseases to which the heart is liable. All these modes of investigation are often unfaithful: we will hereafter examine their claims, and demonstrate that they scarcely

ever exhibit the disease, until its existence can no longer be a question. We will demonstrate that they are especially insufficient to enable us to ascertain and describe an organic affection of the heart at its origin.

In the first place, let me be allowed for one moment to expose rapidly the causes which interfere with the accuracy of these modes of investigation. 1st. The different sounds produced by the two sides of a healthy heart, are not constantly the same in all individuals. 2d. The cause of these varieties is owing to circumstances which we cannot at all times estimate, such for instance as a greater quantity of fat in the thoracic parietes, tubercles in the lungs, bronchial dilatations, &c., &c., &c. 3d. Several morbid states of the heart give rise to the same noise. 4th. And which is much more important, neuroses of the heart may present all the signs furnished by percussion and auscultation in organic affections. 5th. Mensuration, which is only an accessory means, can never be depended upon but in connexion with the other signs exhibited by percussion, auscultation, the facies, and the concomitant phenomena, and finally, becomes useful only in those extreme cases, where the increased size of the heart actually raises the ribs, and prevents all hope of cure. The investigation of the pulse appears to me calculated to remove the obscurity which exists, in the midst of the numerous means which have been suggested to enlighten our diagnosis. But the sense of feeling we resort to in this investigation, is not possessed of that rigorous correctness we desire, and independent of this, it is insufficient to appreciate all the evolutions which a diseased or disturbed heart make it experience. It is therefore by the aid of the sphygmometer, with which we can detect the slightest motion of arterial circulation, that we can study and compare its healthy with its morbid state. It is true that the rhythm of the arteries is not similar in all subjects,—but it will be easier to detect this with the instrument, than it will be to estimate the divers noises produced by the stethoscope, even admitting, as was suggested in former days, that these sounds could be expressed by notes of music.

The sphygmometer, independent of this advantage, has the

faculty of disclosing certain arterial motions characteristic of peculiar lesions of the heart. I request, therefore, of the Academy, to bestow the utmost attention in verifying my observations, promising beforehand to acknowledge my errors; and if in the survey already made, we make any new discoveries, I shall be most happy to be enabled to insert them in the work I am preparing, and for the publication of which, I am only waiting for an encouraging report from this body.

Right Heart.

Stricture of the right auriculo-ventricular passage.—Whatever be the nature of the obstacle, black blood arrives with difficulty in the lungs, and then the following phenomena are exhibited: sensation of weight in the epigastric region, oppression, painful digestion, spasms more or less continued: the motions of the heart are feeble; the pulse is small, irregular, intermittent; œdema of the superior extremities soon makes its appearance, it speedily extends to the lower ones, and the patient expires after a long and painful agony. On examination post mortem, we generally find extreme distension of the auricle. The sphygmometer, in the stricture of the right auriculo-ventricular passage, presents this peculiar phenomenon; the column of mercury does not always fall down to its starting point, or it does not fall at once, it is arrested or checked about the middle by an incidental impulse.

Stricture of the pulmonary ventricle.—A majority of the phenomena, which we have just related as occurring in the disease of the right auricular ventricle, are observed in the strictures of the pulmonary ventricles: with this exception, that the ventricle making considerable efforts to overcome the obstacle which prevents the passage of the blood into the pulmonary artery, occasions in the heart those entire motions constituting what is understood by palpitations, palpitations which are extremely violent, and which bear no relation to the arterial action; thus the pulse is feeble, quivering, tumultuous; it presents the same sphygmometrical signs. This species of lesions may end in two very different modes, and then they give rise

to two organic alterations, which, however, are only the consequence of the mechanical cause of the primitive disease. If the obstacle be of minor importance, and of slow progress, the multiplied action of the ventricle increases its nutrition, and you then have hypertrophy; this latter terminates in pulmonary apoplexy, or an overwhelming hæmoptisis. If, on the contrary, the obstacle speedily attains a considerable degree, it produces an aneurism, a genuine dilatation of the ventricle. Its parietes rapidly become thinner, and a rupture is inevitable, if the patient is not previously carried off by hydrothorax, or general œdema, a necessary consequence of the absence of sanguiferous circulation in the lungs. We cannot admit any hypertrophies of the right ventricle or auricle, without previous stricture; we have never met them isolated; they are always accompanied by vegetations or valvular indurations, as well as by strictures of one of the auriculo-ventricular, or the ventriculo-pulmonary orifices.

Left Heart.

Stricture of the left auricular ventricle.—Continual dyspnoea, considerable oppression, occasioned by exercise in the slightest degree violent, the face assumes a purple colour, more especially the lips, nose, and the cheeks, which are usually covered with varicose vessels. The motions of the heart are soft, pulse feeble, irregular, intermittent, unequal, but much more so than in the strictures of the orifices on the right side; and the reason is, I believe, to be found in the chemical difference of the blood which reaches the ventricle. In fact, if the blood arrives slowly in the lungs, their action is diminished; on the contrary, if it reaches them with facility, their action is increased. In the first case, the blood, being less oxygenated, and consequently less stimulating, will excite only a moderate degree of activity in the left cavities; on the contrary, in the second case, this activity will be great, for the blood, having become regenerated by a more easy respiration and the impression it makes upon the left cavities, will there occasion a considerable activity, especially if any obstacle should be met

in these cavities: the consequence will therefore be a greater irregularity of the pulse; it may also occur that the left ventricle may cease to act until it has been enabled to admit a certain quantity of blood. In both cases the arteries are almost empty, and this fact is proved by their sinking under the sphygmometrical column, which falls below its level in the proportion of one, two, and even three degrees, according to the volume of the artery under consideration, and the importance of the obstacle impeding the passage of the blood into the left ventricle.

Stricture of the aortic ventricle.—This stricture is undoubtedly the most frequent of all; the numerous concentric and eccentric hypertrophies and dilatations of the left ventricle, prove it at once: and among the causes which occasion and give rise to these organic lesions, we must assign the first place to every thing which impedes the passage of the blood into the aorta: affections of the mind, either acute or concentrated; excesses of the table, either increase or constrain the action of the heart; the result is, therefore, that the organ receives an increased quantum of nutriment, or undergoes a forced excitation of its valves and orifices, and then you have a primitive or secondary hypertrophy, a primitive or secondary dilatation; but our present subject is the ventriculo-aortic strictures; let us now examine the phenomena which accompany them: the oppression is greater than in the other strictures, the anxiety more horrible, and the other symptoms which we have described much more decided; the heart is agitated with extreme violence; its immoderate and almost continual efforts occasion inexpressible agony; the patient does not breathe, he chokes, and death threatens him every instant. The pulse is most usually quick, but without any development of impulsions; it is irregular, unequal, frequent, intermittent, and sinks each moment; the sphygmometer reveals even this sign of the emptiness of the arteries in a very remarkable manner. Post-mortem examination almost always exhibits the stricture of the aortic ventricle, accompanied with hypertrophy or dilatation of the ventricle.

Hypertrophy of the heart, without stricture of the orifices.—Strong and deep beating of the heart, vertigoes princi-

pally after rest, glows of heat in the face on the least agitation of the mind, oppression produced by the slightest exercise, &c.; the pulse is regular as to its periods, but unequal in the degree of its contractions; it presents this anomaly, that the column of mercury, after being forced to a certain number of degrees, to 3 or 4, for instance, suddenly ascends at intervals to 8, 10, or even 15 degrees. The simple hypertrophy of the left ventricle is always sufficient to produce this peculiar character of the pulse. The dilatation of the left ventricle, and of its auricle, exhibits the same sphygmometrical signs, as those of the strictures of the auricular ventricles and aortic ventricles. Auscultation, percussion, mensuration, and the examination of the other functions of life, serve to distinguish the advanced organic lesions from strictures or vegetations in their incipient state.

This is the limit of my sphygmometrical researches into the organic diseases of the heart; but before I conclude, I ask of the Academy permission to add, in support of what I have advanced, the schedule of the different facts that I have observed.

ORGANIC LESIONS.	CHARACTER OF THE PULSE, AND SPHYGMOMETRICAL SIGNS.	POST MORTEM OBSERVATIONS.	REMARKS.
<p>Strictures of the auriculo ventricular orifice of the right side, and strictures of the auriculo pulmonary orifice.</p> <p>22 patients.</p>	<p>Small, irregular, unequal, intermittent, sometimes imperceptible. The column of mercury does not fall down to its starting point, or falls in two efforts; it is checked about half way by some incidental impulse.</p>	<p>Strictures of different kinds, and dilatations more or less advanced, of the auricle and the ventricle. A slight hypertrophy was found in the right ventricle of 4 subjects.</p>	<p>In 8 of these cases, auscultation furnished only a slight sound; in 6 the <i>cataire</i>* sound was very evident; in the 8 other cases, there was no morbid sound. Oppression, and more or less alteration of the features and colour of the face, were the only symptoms which could have induced the belief of the disease.—4 died of pulmonary apoplexy, and the others in a state of general œdema.</p>
<p>Strictures of the auriculo ventricular passage of the left side, and strictures of the aortic ventricles.</p> <p>27 patients.</p>	<p>The pulse is feeble, irregular, intermittent, unequal, but much more so than in the strictures of the right orifices. The column of mercury in the sphygmometer falls below its level, 1, 2, and even 3 degrees, in proportion to the extent of the obstacle.</p>	<p>In 12 cases the heart was not in a state of hypertrophy, but merely dilated: the other 15 exhibited an incipient hypertrophy of the left auricle and ventricle.</p>	<p>The pulse was extremely feeble; in the first 12 cases they died of hydrothorax, in a general state of œdema; of the last 15 cases, 8 perished from hæmoptysis, 5 from various affections of the lungs, and 2 died from cerebral hemorrhage. In these 15 cases, the pulse was tense, frequent, and quick, but was only slightly developed.</p>
<p>Hypertrophies of the heart, without strictures of the orifices.</p> <p>18 patients.</p>	<p>The pulse is regular as to time, but unequal in its contractions. It affords this anomaly, that the column of mercury, after having risen to a certain number of degrees, to 3 or 4 for instance, suddenly rises, by intervals, to 8, 10, or even 15 degrees.</p>	<p>The examination of 18 individuals, upon whom I had observed this sphygmometrical sign, disclosed a concentric or eccentric hypertrophy of the left ventricle, without stricture of the orifices.</p>	<p>In those cases wherein concentric hypertrophy existed, the pulse did not exhibit the same development which is observed in eccentric hypertrophy, but it presented the same character of inequality in its contractions. The signs afforded by auscultation were met with in 8 cases; in the remainder they were so indistinct as to afford no grounds by which a lesion of the heart, in an advanced stage, could have been recognised.</p>

* *Cataire bruissement, or fremissement cataire.* A sensation which, when existing in the heart, is excited by applying the hand to the region of this organ, and is analogous to the sensation produced by the saw and rasp sounds.—*Corvisart, Laennec, and Copland.*—J. G. N.

CONCLUSION.

Whenever the action of the heart becomes disturbed, and in exploring the pulse with the sphygmometer, we meet with none of the symptoms by which one or more of the organic lesions of that viscus are characterized, we may hope that the rhythmical aberration depends upon other causes than a lesion of its texture. We must then seek these causes in affections of those organs with which this centre of the circulation sympathizes.

The treatment that may be requisite, must depend upon the result of this investigation. I can say with truth, that many affections considered organic, with the aid of the ordinary means alone, have, when examined in the mode now proposed, been easily relieved by a rational medical treatment.

I shall have occasion, in a work specially devoted to this subject, which I intend to publish, to prove, by a great number of anatomical facts, that changes in those organs which are closely connected by sympathy with the heart, almost always accompany its own lesions; a circumstance which satisfactorily explains the derangements of the circulation, and consequently the organic diseases of the viscus which is at its centre.

The health of the system depends upon an equilibrium of the parts of which it is composed. When one organ languishes, or when, from being over excited, its action is increased, it does not suffer alone, but all the organs whose functions it influences in any degree, sustain an injury more or less considerable.

We have heard it repeated till we are wearied, that the passions are the most common causes of affections of the heart; but who dare assert that certain conditions of this viscus are not themselves the most powerful agitators of the passions? Who can doubt that an overgrown heart predisposes to irritations of the brain? or even that the cases of monomania furiosa, erotomania, &c., which have terminated in death, after many years of continued suffering, have been coincident with organic lesions of the heart? Violent passions are therefore

not sufficient to produce organic affections of the heart ; but hypertrophies of the left ventricle, on the contrary, occasion such a degree of cerebral irritation, as will be manifested either in a simple transport of anger, or even in furious madness ; in simple congestion, or in overwhelming apoplexy.

The subjects of these dilatations and strictures are usually phlegmatic and indolent ; and almost all addicted to the pleasures of the table. These two conditions, if they accompany an active sanguification, are not slow in furnishing a quantity of blood excessive in proportion to the capacity of the vascular system at large. The evident result is, that the muscular action of the heart is increased ; next, that the organ experiences irritation, or that its cavities become enlarged.

I believe that the most common cause of diseases of the heart, consists in the quantity of nutriment being greater than is proportioned to the amount of exercise, or in exercise carried beyond our strength. Where the amount of fluids absorbed exceeds that of the excretions, engorgement ensues, and the reservoirs becoming impaired, dilate or burst. I ought, perhaps, gentlemen, to insist further upon these etiological considerations, for they are capable of leading us to therapeutical conclusions of the utmost importance ; but again I am compelled to restrain myself, and I shall finish by repeating, that an incipient affection of the heart has always appeared to me susceptible of cure ; and that during six years that I have occupied myself attentively with the lesions of this organ, I have often been able to detect them when no one could even have suspected their existence, who was aided by those means alone that have been heretofore known. I have been enabled to observe their progress, and, much to my regret, see them arrive at that stage, when they no longer admitted of a remedy. The invalids had rejected that advice which would have subjected them to privations, and when ultimately induced to seek for succour, the resources of the healing art proved insufficient for their relief.

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